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THE MYXOPHYCEAE OF MARYLAND

BY

FRANCIS DROUET

CURATOR OF CRYPTOGAMIC BOTANY

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THE MYXOPHYCEAE OF MARYLAND

FRANCIS DROUET

The algal flora of the middle and southern Atlantic states is very inadequately represented in herbaria and in the literature. Taylor in his *Marine Algae of the Northeastern Coast of North America* (1937) has made this fact evident in respect to the marine flora. The fresh-water algae are known to us chiefly through the accumulated herbarium of Francis Wolle, whose publications ceased as long ago as 1893. Scattered local floras have been listed, but they are sketchy and their areas are extremely restricted; few of the specimens (if extant) which support them have found their ways out of private hands. The flora of brackish water, the most conspicuous elements of which are as a rule the Myxophyceae, has been almost totally neglected, even though the areas of salt marshes and tidewater here are probably as extensive as anywhere else in North America.

I was therefore greatly pleased to receive the invitation to visit and collect with Mr. Philip W. Wolle in Somerset County, Maryland, on the eastern shore of Chesapeake Bay, in August, 1938. Salt marshes occur along almost the entire shore of this county and on the islands attached to it. Tidewater rivers extend far inland. During a week's time, Mr. Wolle and I gathered in collections from every habitat, fresh, brackish, and semi-marine, that we could discover. We owe much of the success of this joint collecting to Mr. Roger White, Mr. Leo A. Bailey, and Dr. Robert H. Johnson, who gave us transportation to interesting and out-of-the-way places in the region.

Later, I had the pleasure of visiting Dr. Lewis P. McCann at College Park and of collecting with him and Dr. G. B. Reynard in Prince Georges County. Before leaving the state, I went with Dr. Mark W. Woods, Dr. McCann, and Mr. D. S. Stoddard on a tour into Garrett County, where opportunity arose to visit localities examined for algae in 1878 by Captain John Donnell Smith.

The number of collections of algae from eastern Maryland has been further augmented by Mr. Wolle's recent collecting. Dr. Harold C. Bold and Dr. F. E. Allison have obligingly given me much of their own blue-green algal material from the state for study.

In the citation of specimens below, serial numbers in italics are used to indicate my own collections or those made conjointly with others mentioned above. All of such collections were taken during

the period August 21–30, 1938. This material is cited as in my own herbarium, but duplicate specimens have been distributed to the Field Museum of Natural History, Mr. P. W. Wolle, the Farlow Herbarium, the Herbarium of Mr. J. C. Strickland, the New York Botanical Garden, the Naturhistoriska Riksmuseet at Stockholm, and elsewhere. In general, other specimens are to be found in herbaria as indicated by the following abbreviations: D, my personal herbarium; F, Farlow Herbarium of Harvard University; FM, Field Museum of Natural History; G, Herbarium of Goucher College; N, New York Botanical Garden; P, Herbarium of the University of Pennsylvania; U, United States National Herbarium. It is to be understood that, unless otherwise stated, references to Gomont are all to his 'Monographie des Oscillariées' (1892–93) and those to Bornet & Flahault are all to their 'Révision des Nostocacées heterocystées' (1886–88).

The Chroococcaceae

CHROOCOCCUS TURGIDUS (Kütz.) Näg., Gatt. einzell. Alg. 46 (1849). *Protococcus turgidus* Kütz., Tab. Phyc. 1: 5 (1845).—In brackish water, SOMERSET COUNTY: marsh pool at Chance, *2268* (D); marsh pool west of Ewell, Smiths Island, *2306* (D); marsh pool, Tylerton, Smiths Island, *P. W. Wolle* (FM, Wolle).

APHANOTHECE STAGNINA (Spreng.) A. Br. in Rabenh., Fl. Eur. Algar. 2: 66 (1865). *Coccochloris stagnina* Spreng., Fl. Halens. Mant. 1: 14 (1807).—One specimen, from fresh water, CALVERT COUNTY: pool, Cove Point, *H. C. Bold*, 1936 (FM).

GOMPHOSPHAERIA APONINA Kütz., Alg. exs. Dec. 16: 151 (1836).—In brackish water, SOMERSET COUNTY: marsh pool between Chance and Dames Quarter, *P. W. Wolle*, June 12, 1938 (D), *2260* (D).

JOHANNESBAPTISTIA PELLUCIDA (Dickie) Tayl. & Drouet, Bull. Torr. Bot. Club 65: 285 (1938).—For the lengthy synonymy of this species, see the above reference. The three collections listed here extend the known range of this brackish-water species far to the north of that described previously. CONNECTICUT: with *Hydrocoleum Holdenii*, Fresh Pond, Stratford, *I. Holden 1035*, Sept. 1894 (D, F). MARYLAND: SOMERSET COUNTY: marsh pool west of Ewell, Smiths Island, *2307* (D); with *Gomphosphaeria aponina*, marsh pool between Chance and Dames Quarter, *P. W. Wolle*, July 12, 1938 (D).

The Stigonemataceae

STIGONEMA MINUTUM (Ag.) Hass. ex Born. & Flah.—Two specimens from wet rocks: BALTIMORE COUNTY: Loch Raven, *J. E.*

Humphrey, Nov. 10, 1894 (G). GARRETT COUNTY: Deep Creek, *J. D. Smith*, July 26, 1878 (U).

STIGONEMA INFORME Kütz. ex Born. & Flah.—Also from wet rocks, GARRETT COUNTY: Falls of Deep Creek, *J. D. Smith*, July 26, 1878 (P, U).

STIGONEMA MAMILLOSUM (Lyngb.) Ag. ex Born. & Flah. f. **robustum** (Gardn.), *comb. nov. S. robustum* Gardn., Univ. Calif. Publ. Bot. 14: 9, pl. 4 (1927).—The Maryland material cited here is similar in habit and structure to the TYPE of *S. robustum* from China in the Farlow Herbarium and to material placed under the same name from Brazil (see Amer. Journ. Bot. 25: 658. 1938) in the Riksmuseet at Stockholm and from Virginia in my own herbarium. Morphologically, all of this material is indistinguishable, except for size of filaments, from those specimens cited as typical *S. mamillosum* by Bornet & Flahault. I have not had the opportunity to see a sufficient number of specimens to decide whether or not the two forms can always be separated with ease on the basis of size differences alone. One collection, from rocks partially submersed in swift, shallow water, GARRETT COUNTY: Swallow Falls, *2342* (D, FM).

HAPALOSIPHON PUMILUS (Kütz.) Kirchn. ex Born. & Flah. *H. fontinalis* (Ag.) Born., Bull. Soc. Bot. France 36: 156 (1888). *H. brasiliensis* Borge, Ark. f. Bot. 15 (13): 94 (1919).—In fresh water and wet places. WORCESTER COUNTY: Old Mill Pond, Nassawongo Creek, Atkinson's District, *P. W. Wolle*, Nov. 19, 1938 (FM). GARRETT COUNTY: 3 miles north of Oakland, *2336* (D).

The Nostocaceae

NOSTOC PISCINALE Ag. ex Born. & Flah.—In fresh water, BALTIMORE COUNTY: Loch Raven, *C. E. Waters*, July 29, 1897 (F).

NOSTOC MUSCORUM Ag. ex Born. & Flah.—A very common soil alga throughout the northeastern and north central states, often most abundantly developed in dried rain pools. SOMERSET COUNTY: Wolle Farm, 3 miles northwest of Princess Anne, *2296* (D). PRINCE GEORGES COUNTY: on bank of Paint Branch at Riggs Road west of Beltsville, *2321* (D). GARRETT COUNTY: springy places in pasture 3 miles north of Oakland, *2341* (D).

NOSTOC COMMUNE Vauch. ex Born. & Flah.—BALTIMORE COUNTY: on earth, Loch Raven, *J. E. Humphrey*, Apr. 29, 1897 (G), *C. E. Waters*, July 24, 1897 (Phyc. Bor.-Amer. 403a, D, FM); Towson, *Humphrey*, Nov. 10, 1889, 1894 (G).

ANABAENA SPHAERICA Born. & Flah.—SOMERSET COUNTY: in a brackish ditch between Wenona and Deal Island, *2265* (D).

ANABAENA VARIABILIS Kütz. ex Born. & Flah.—In fresh water, WICOMICO COUNTY: on wet sand, Sandy Hill Beach, Tyaskin, *2252* (D).

NODULARIA HARVEYANA Thur. ex Born. & Flah.—SOMERSET COUNTY: floating in a brackish pond, Rhodes Point, Smiths Island, *2302* (D).

CYLINDROSPERMUM MAJUS Kütz. ex Born. & Flah. *C. janthinum* Dickie ex Born. & Flah., sp. inquir.—On moist soil. BALTIMORE COUNTY: rocks, *J. D. Smith*, May 13, 1878 (P, U). MONTGOMERY COUNTY: banks near Glen Echo, *F. E. Allison 37, 38*, July 10, 1937 (D, F, N).

CYLINDROSPERMUM MUSCICOLA Kütz. ex Born. & Flah. *C. caeruleum* Dickie ex Born. & Flah., sp. inquir.—MONTGOMERY COUNTY: in shallow water, Dalecarlia Reservoir, Conduit Road near District of Columbia, *F. E. Allison 42*, July 10, 1937 (D).

CYLINDROSPERMUM LICHENIFORME (Bory) Kütz. ex Born. & Flah. —MONTGOMERY COUNTY: on soil near Dalecarlia Reservoir, *F. E. Allison 40, 41*, July 10, 1937 (D, N).

The Rivulariaceae

CALOTHRIX PULVINATA (Mert.) Ag. ex Born. & Flah.—In marine and brackish waters. WICOMICO COUNTY: on pilings in Nanticoke River, Sandy Hill Beach, Tyaskin, *2253* (D). SOMERSET COUNTY: with *Fremyella grisea*, on piling of old wharf at Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM).

RIVULARIA NITIDA Ag. ex Born. & Flah.—In wet brackish places. SOMERSET COUNTY: on cedar stumps at head of Pocomoke Sound, below Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM).

GLOEOTRICHIA NATANS (Hedw.) Rabenh. ex Born. & Flah. *Rivularia natans* (Hedw.) Welw. ex Born. & Flah., pro synon. *Rivularia* (*Gloeotrichia*) *flagelliformis* Gardn.,[1] Mem. New York Bot. Gard. 7: 71 (1927).—In fresh water, CALVERT COUNTY: Pt. Patience, *H. C. Bold*, 1937 (FM).

The Scytonemataceae

FREMYELLA GRISEA (Born. & Flah.) J. DeToni, Noter. Nomencl. Algol. VIII (1936). *Microchaete grisea* Thur. ex Born. & Flah.—In

[1] The TYPE of *R. flagelliformis* in the New York Botanical Garden and an isotype in the U. S. National Herbarium (PUERTO RICO: in a water reservoir near Rio Piedras, *N. Wille 126*, Dec. 28, 1914) consist of typical plants of *Gloeotrichia natans* with principally young spores and very few almost mature ones.

brackish and marine waters. SOMERSET COUNTY: on piling of old wharf at Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM).

TOLYPOTHRIX TENUIS Kütz. ex Born. & Flah. *T. rupestris* Wolle, F. W. Alg. U. S. 1: 265 (1887); Geitler, Rabenh. Kryptogamen-Fl. 14: 733 (1932).—In fresh water, BALTIMORE: on grasses in pools in abandoned brickyard, *J. E. Humphrey*, Oct. 10, 1896 (Phyc. Bor.-Amer. 257, FM).

SCYTONEMA TOLYPOTRICHOIDES Kütz. ex Born. & Flah. *S. gracile* var. *tolypotrichoides* Wittr. ex Born. & Flah., sp. inquir.—In fresh water, GARRETT COUNTY: Falls of Deep Creek, *J. D. Smith*, July 26, 1878 (P).

SCYTONEMA HOFMANNII Ag. ex Born. & Flah.—Subaerial in moist places, BALTIMORE COUNTY: on wet moss, Loch Raven, *J. E. Humphrey*, Nov. 10, 1894 (G).

SCYTONEMA OCELLATUM Lyngb. ex Born. & Flah.—Usually found on rocks and soil wet occasionally by rains. PRINCE GEORGES COUNTY: bank of Paint Branch at Riggs Road west of Beltsville, *2322* (D).

SCYTONEMA GUYANENSE (Mont.) Born. & Flah. *S. guyanense* var. *minus* Gardn.,[1] Mem. New York Bot. Gard. 7: 79 (1927).—On rocks and trees, most abundant in the warmer regions of the Western Hemisphere. BALTIMORE COUNTY: on wet rocks near L. Roland, *J. E. Humphrey*, Apr. 20, 1895 (G).

The Oscillatoriaceae

SCHIZOTHRIX PURPURASCENS (Kütz.) Gom. *Hydrocoleum rufescens* Gardn.,[2] Mem. New York Bot. Gard. 7: 57 (1927).—A common inhabitant of soil wet only by rains in the eastern United States. GARRETT COUNTY: in an old field 3 miles north of Oakland, *2338* (D).

SCHIZOTHRIX MUELLERI Näg. ex Gom. *Hydrocoleum Hieronymii* Richt.[3] in Hauck & Richt., Phyk. univ. 543 (1892).—On moist soil

[1] The TYPE of this variety in the New York Botanical Garden, PUERTO RICO: on rocks along the roadside, Arecibo to Utuado, *N. Wille 1455*, Mar. 4, 1915, said to have filaments more tenuous than those in the typical variety, appears to differ in no respect from material of *S. guyanense* cited by Bornet & Flahault.

[2] The TYPE of *Hydrocoleum rufescens* in the New York Botanical Garden, PUERTO RICO: on red soil at the Experiment Station, Mayaguez, *N. Wille 972*, Feb. 6–8, 1915, is excellent material of *Schizothrix purpurascens*.

[3] I can find nothing to distinguish the isotypic material of *Hydrocoleum Hieronymii* in the Farlow Herbarium, GERMANY: in Carlowitz bei Breslau, *G. Hieronymus*, Sept.-Okt. 1891 (Phyk. univ. 543), from specimens of *Schizothrix Muelleri* cited by Gomont. Geitler has made a similar suggestion in Rabenh. Kryptogamen-Fl. 14: 1157 (1932).

and rocks, GARRETT COUNTY: with *S. Friesii*, Falls of Deep Creek, *J. D. Smith*, July 26, 1878 (U).

HYDROCOLEUM HOLDENII Tild., Rhodora 3: 254 (1901); Drouet, idem 40: 229 (1938). *H. majus* Holden, idem 1: 197 (1899), not Mart.—These Maryland records extend the known distribution far to the south of southern New England, whence previously recognized material has come. As in the northern part of its range, *H. Holdenii* is here an inhabitant of brackish pools. WORCESTER COUNTY: in a salt marsh 1 mile south of Public Landing, Assateague Bay, *P. W. Wolle*, Nov. 19, 1938 (FM). SOMERSET COUNTY: marsh ditch at Tylerton, Smiths Island, *P. W. Wolle*, Aug. 12, 1938 (FM, Wolle).

MICROCOLEUS CHTHONOPLASTES (Fl. dan.) Thur. ex Gom.—Often the commonest and most conspicuous alga on shores and about brackish pools. SOMERSET COUNTY: on mud flat between Ewell and Rhodes Point, Smiths Island, *2303* (D); brackish ditch between Wenona and Deal Island, *2266* (D); wet sand along Upper Thoroughfare, Deal Island, *2263* (D); on wet soil at White Haven Ferry, Mt. Vernon, *2251* (D).

MICROCOLEUS TENERRIMUS Gom.—In marine and brackish waters, SOMERSET COUNTY: on pilings, Wenona, *2284* (D).

MICROCOLEUS VAGINATUS (Vauch.) Gom.—As abundantly represented as *Nostoc Muscorum* on open soil wet occasionally by rains in eastern North America. PRINCE GEORGES COUNTY: with *Scytonema ocellatum*, bank of Paint Branch at Riggs Road west of Beltsville, *2322* (D).

PLECTONEMA GOLENKINIANUM Gom., Bull. Soc. Bot. France 46: 35 (1899); Collins, Holden & Setchell, Phyc. Bor.-Amer. 13: 603 (1899). *Lyngbya* (*Leibleinia*) *subtilis* Holden[1] in Collins, Holden & Setchell, Phyc. Bor.-Amer. 24: 1163 (1904), not West. *Lyngbya Holdenii* Forti,[1] Syll. Myxophyc. 260 (1907).—In marine and brackish water. SOMERSET COUNTY: with *Fremyella grisea*, on piling of old wharf at Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM).

[1] The case of *Lyngbya subtilis* Holden is a somewhat peculiar one. The original description was published in company with specimens of a true Lyngbya (see below) from Massachusetts which are quite different in nature from the TYPE in the Farlow Herbarium from CONNECTICUT: Bridgeport, *I. Holden*, Jan. 10, 1891. The form represented in the type specimen is similar to that of the co-type of *Plectonema Golenkinianum* Gom. distributed in Phyc. Bor.-Amer. 603. The two collections, one from Maine and the other from Massachusetts, distributed in Phyc. Bor.-Amer. 1007 under the manuscript name *Lyngbya subtilis* Holden, consist of this same species of Plectonema. The name *L. Holdenii* was proposed by Forti to replace the name preoccupied by *L. subtilis* West, Journ. Roy. Microsc. Soc. 1892: 741 (1892). The true Lyngbya represented in Phyc. Bor.-Amer. 1163 has already been described by Collins as *Schizothrix Simmonsiae*, in Phyc. Bor.-Amer. 707. The isotypic specimens accompanying the description of *S. Sim-*

SYMPLOCA MUSCORUM (Ag.) Gom. *Phormidium Corium* var. *capitatum* Gardn.,[1] Univ. Calif. Publ. Bot. 14: 4 (1927). *P. interruptum* var. *capitatum* Gardn.,[1] Mem. New York Bot. Gard. 7: 44 (1927).—Also a soil form, often developing in places which are moist for a considerable part of the year. SOMERSET COUNTY: in an artesian spring, Kings Creek, *2292* (D). HARFORD COUNTY: Spesutie Island, *J. D. Smith*, Oct. 1878 (P). PRINCE GEORGES COUNTY: swamp 1 mile west of Beltsville, *2315*, *2318* (D); soil under pear trees, Beltsville, *F. E. Allison 16*, June 14, 1937 (D). GARRETT COUNTY: Falls of Deep Creek, *J. D. Smith*, Oct. 1878 (U); on soil in an old field 3 miles north of Oakland, *2339* (D).

LYNGBYA AESTUARII (Mert.) Liebm. ex Gom.—Submersed and subaerial in brackish and marine waters. WORCESTER COUNTY: in a salt marsh at Public Landing, Assateague Bay, *P. W. Wolle*, Nov. 19, 1938 (FM). SOMERSET COUNTY: on mud in street, Ewell, Smiths Island, *2300* (D); brackish ditch, Ewell, *2308* (D).

LYNGBYA CONFERVOIDES Ag. ex Gom.—On rocks and wood in marine waters. WORCESTER COUNTY: pilings of old wharf at Public Landing, Assateague Bay, *P. W. Wolle*, Nov. 19, 1938 (FM). SOMERSET COUNTY: jetty, Upper Thoroughfare, Deal Island, *2264* (D); on rocks, Wenona, *2282* (D).

LYNGBYA SEMIPLENA (Ag.) Ag. f. ex Gom.—On rocks etc. in marine and brackish waters. CALVERT COUNTY: in Chesapeake Bay, *H. C. Bold*, July 5, 1937 (FM).

monsiae have all the characteristics of a species of Lyngbya in the hormogonial state and closely related to *L. gracilis* (Menegh.) Rabenh. ex Gom. For disposal of these specimens, I propose the following:

LYNGBYA **Simmonsiae** (Collins), *comb. nov.* *Schizothrix Simmonsiae* Collins in Collins, Holden & Setchell, Phyc. Bor.-Amer. 15: 707 (1900). Fila epiphytica, recta aut flexuosa, aggregata, flexilia, rosea vel aeruginea; vaginis tenuibus usque paullo incrassatis, hyalinis, passim lamellosis, parce mucosis, chlorozincico iodurato laete caerulescentibus; trichomatibus pallide aerugineis usque roseis, ad genicula evidenter constrictis, saepe torulosis, 3μ ad 5μ crassis, haud attenuatis; articulis subquadratis usque diametro sextuplo brevioribus, 0.5μ ad 3.5μ longis; protoplasmate homogeneo, passim tenui-granuloso; cellula apicali rotundata, calyptra nulla (v. s.).—Epiphytic on larger algae in quiet marine waters of southern New England: MASSACHUSETTS: on Enteromorpha, Magnolia, *W. G. Farlow*, Sept. 1903 (co-type of *Lyngbya subtilis* Holden in Phyc. Bor.-Amer. 1163, D, F, FM, N); water sample from Vineyard Sound, *L. C. Lillick*, Summer 1938 (FM). RHODE ISLAND: on algae in high rock pool, Easton's Point, Newport, *Mrs. W. C. Simmons*, Dec. 1897 (TYPE in Herb. New York Bot. Gard.; isotypes in Phyc. Bor.-Amer. 707, D, F, FM, N).

[1] The specimens (among them the TYPE from CHINA: Kuliang near Foochow, Fukien Province, *H. H. Chung A402*) in the Farlow Herbarium which Gardner cited with the original description of *Phormidium Corium* var. *capitatum* are excellent and typical material of the inundated form of *Symploca Muscorum*. The TYPE of *Phormidium interruptum* var. *capitatum* (PUERTO RICO: side of road near Humacao, *N. Wille 540*, Jan. 20–24, 1915) in the New York Botanical Garden is to be interpreted in a similar fashion.

LYNGBYA LUTEA (Ag.) Gom. *Oscillatoria sordida* Dickie ex Forti, Syll. Myxophyc. 192 (1907).—On rocks etc. in salt and brackish water, also on wet soil on shores. DORCHESTER COUNTY: on banks of Nanticoke River opposite Sandy Hill Beach (Tyaskin), *2258* (D).

LYNGBYA OCHRACEA (Kütz.) Thur. ex Gom.—In shallow pools in springy ground. PRINCE GEORGES COUNTY: below dam of pond, Riggs Road at Paint Branch west of Beltsville, *2325* (D).

PHORMIDIUM Weissii, *sp. nov.* Stratum aerugineum aut nigrescens, mucosum vel membranaceum; trichomatibus rectis undulatisve, fragilibus, paralleliter in muco amorpho hyalino chlorozincico iodurato haud caerulescente dispositis, ad genicula evidenter constrictis,

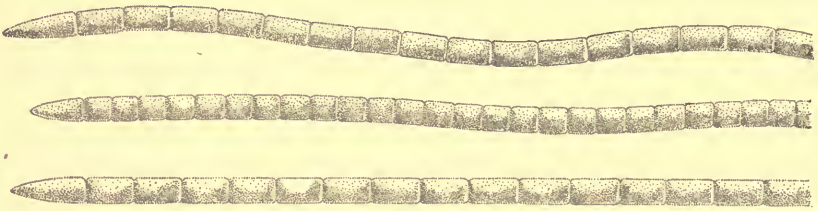

FIG. 1. *Phormidium Weissii*, sp. nov., drawn from the TYPE specimen by Mrs. Inez Austin.

numquam torulosis, 1.0μ ad 2.5μ crassis, superne rectis vel curvatis uncinatisve, ad apices sensim et longe attenuatis et acutis; articulis subquadratis aut diametro usque duplo longioribus, 1.5μ ad 5μ longis; protoplasmate per totam cellulam homogeneo, raro tenui-granuloso; dissepimentis conspicuis, haud granulatis; cellula apicali acute conica, haud capitata, sine calyptra (v. v., v. s., v. in form.). **Fig. 1.** In brackish and marine waters of low salinity along the eastern shore of North America, MASSACHUSETTS: in high pools on rocks, Black Rock, off Sconticut Point, Fairhaven, *C. M. Palmer & Drouet 2177*, Sept. 1, 1937 [TYPE in Herb. F. Drouet; Isotypes: British Museum (Natural History), F, FM, N, Naturhistoriska Riksmuseet (Stockholm), Herb. J. C. Strickland]; on rocks in high tide pools, Penikese Island, Gosnold, *J. Cohn*, July 10, 1934 (D); Botanical Survey of Penikese Island (Herb. Marine Biol. Lab.). MARYLAND: SOMERSET COUNTY: in a brackish pool, Wenona, *2279* (D); on Ruppia in a marsh pool between Ewell and Rhodes Point, Smiths Island, *2305* (D); road puddle at old wharf, Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM). FLORIDA: southwest Florida, *J. D. Smith*, Mar. 1878 (D, P, U). BAHAMA ISLANDS: in the lagoon, Watling Island, *M. A. Howe 5095*, Nov. 25, 1907 (D).

This well characterized species of brackish water has passed in herbaria and literature under several names: *P. Boryanum* in herb. Wolle; *P. tenue* according to Hazen in Lewis, Rhodora 26: 211 (1924); *P. valderianum* in Collins' list of algae in Britton & Millspaugh, *The Bahama Flora*, p. 621 (1920); and *P. fragile* in my recent treatment of the southern Massachusetts Oscillatoriaceae in Rhodora 40: 260 (1938). In my own herbarium, material has heretofore been filed tentatively with *P. fragile* (Menegh.) Gom. and *P. subuliforme* Gom.; specimens of Nos. 2279 and 2305 from Maryland have been distributed to other herbaria under these names. Morphologically *P. Weissii* is closely related to these two species. It gives me much pleasure here to name this new form in honor of Mr. Philip Weiss Wolle, to whose ardent enthusiasm for microscopy and collecting I am chiefly indebted for the opportunity to study the Myxophyceae of the state of Maryland.

PHORMIDIUM INUNDATUM Kütz. ex. Gom. *P. purpurascens* var. *elegans* Drouet, Bot. Gaz. 95: 696 (1934).—One specimen from fresh water: BALTIMORE COUNTY: *J. D. Smith*, May 1878 (U).

PHORMIDIUM RETZII (Ag.) Gom. *P. leptodermum* var. *capitatum* Gardn.,[1] Mem. New York Bot. Gard. 7: 43 (1927).—In running fresh water. BALTIMORE COUNTY: on dripping rocks, Loch Raven, *J. E. Humphrey*, Apr. 4, 1895 (G). PRINCE GEORGES COUNTY: on stones in stream near Paint Branch at Riggs Road west of Beltsville, *2324* (D).

PHORMIDIUM FAVOSUM (Bory) Gom.—In running fresh water, etc. BALTIMORE COUNTY: near L. Roland, *J. E. Humphrey*, Mar. 23, 1895 (G); foul drain ditch, *J. D. Smith*, May 23, 1878 (P, U).

PHORMIDIUM SUBFUSCUM var. JOANNIANUM (Kütz.) Gom.—In running fresh water. BALTIMORE COUNTY: mill dam, *J. D. Smith*, May 1878 (P, U).

PHORMIDIUM UNCINATUM (Ag.) Gom.—In fresh water. BALTIMORE COUNTY: foul drain ditch, *J. D. Smith*, May 23, 1878 (P).

PHORMIDIUM AUTUMNALE (Ag.) Gom. *Lyngbya hahatonkensis* Drouet, Bot. Gaz. 95: 696 (1934).—On wet soil etc., seldom found submerged in fresh water. CALVERT COUNTY: watering trough, Solomons, *H. C. Bold*, July 2, 1936 (FM). CARROLL COUNTY: on soil in a farmyard at Sauble's Inn, Taneytown, *F. E. Allison 30*, July 5, 1937 (D).

[1] The TYPE of *P. leptodermum* var. *capitatum* in the New York Botanical Garden, PUERTO RICO: on rocks in a stream of warm water, Coamo Springs, *N. Wille 364*, Jan. 12, 1915, is excellent material of *P. Retzii*.

OSCILLATORIA PRINCEPS Vauch. ex Gom. *O. obtusa* Gardn.,[1] Mem. New York Bot. Gard. 7: 38 (1927). *Lyngbya gigantea* Lewis, Zirkle & Patrick, Journ. Elisha Mitchell Sci. Soc. 1933: 221 (1933).—In quiet fresh water, SOMERSET COUNTY: in seepage water, Kings Creek, *2290* (D); with *O. proboscidea.* 'Red Bridge,' headwaters of the Manokin River, Princess Anne, *P. W. Wolle,* July 6, 1938 (D).

OSCILLATORIA PROBOSCIDEA Gom. *O. refringens* Gardn.,[2] Mem. New York Bot. Gard. 7: 38 (1927).—In similar situations as, and often in company with, the preceding. SOMERSET COUNTY: 'Red Bridge,' headwaters of the Manokin River, Princess Anne, *P. W. Wolle,* July 6, 1938 (D). BALTIMORE: Biology Laboratory, Johns Hopkins University, *J. E. Humphrey,* Mar. 9, 1895 (G).

OSCILLATORIA LIMOSA Ag. ex Gom.—In fresh water. GARRETT COUNTY: *J. D. Smith,* Aug. 4, 1878 (U).

OSCILLATORIA CURVICEPS Ag. ex Gom.—In fresh water. BALTIMORE COUNTY: in stream, Loch Raven, *J. E. Humphrey,* Nov. 10, 1894 (G).

OSCILLATORIA ORNATA Kütz. ex Gom.—In fresh water. CALVERT COUNTY: with *Spirulina major,* Cove Point, *H. C. Bold,* July 6, 1937 (FM).

OSCILLATORIA MARGARITIFERA Kütz. ex Gom.—In brackish and semi-marine waters, SOMERSET COUNTY: marsh ditch at Wenona, *P. W. Wolle,* June 12, 1938 (D); marsh pool at Chance, *2269* (D); with *Hydrocoleum Holdenii,* marsh ditch at Tylerton, Smiths Island, *P. W. Wolle,* Aug. 12, 1938 (FM, Wolle).

OSCILLATORIA NIGRO-VIRIDIS Thw. ex Gom.—In marine and semi-marine waters. SOMERSET COUNTY: on pilings, Wenona, *2283* (D).

OSCILLATORIA TENUIS Ag. ex Gom. *O. tenuis* var. *levis* Gardn.,[3] Mem. New York Bot. Gard. 7: 38 (1927).—In quiet fresh water. SOMERSET COUNTY: Manokin River marsh, 2 miles west of Princess Anne, *P. W. Wolle,* Oct. 9, 1938 (FM). BALTIMORE COUNTY: foul drain ditch, *J. D. Smith,* Mar. 23, 1878 (P, U). ANNE ARUNDEL

[1] The TYPE of *O. obtusa* in the New York Botanical Garden, PUERTO RICO: in a pool, Parque Borinquen, Santurce, *N. Wille 807,* Feb. 3, 1915, is indistinguishable to me from other specimens which I have placed in *O. princeps.*

[2] The TYPE of *O. refringens,* PUERTO RICO: among water plants in the Turabo River, Caguas, *N. Wille 486b,* Jan. 15–17, 1915, in the New York Botanical Garden is typical material of *O. proboscidea.*

[3] The TYPE of *O. tenuis* var. *levis* in the New York Botanical Garden, PUERTO RICO: among other algae in the Turabo River, Caguas, *N. Wille 486a,* Jan. 17, 1915, appears to represent the larger form of *O. tenuis* designated as var. *natans* (Kütz.) Gom.

COUNTY: *Smith*, May 18, 1878 (P). GARRETT COUNTY: *Smith*, July 1878 (U).

OSCILLATORIA AMPHIBIA Ag. ex Gom.—In brackish and almost fresh water. SOMERSET COUNTY: marsh pool between Chance and Dames Quarter, *2161A* (D).

OSCILLATORIA SALINARUM Collins in Collins, Holden & Setchell, Phyc. Bor.-Amer. 24: 1160 (1904). *O. luteola* Drouet, Rhodora 39: 277, f. 1 (1937).—When I described *O. luteola* in 1937, it had puzzled me that I had not found an earlier name for this very often encountered species of brackish water from the coasts of both Americas. The possibility of applying the name *O. salinarum* Collins had suggested itself, but at that time I had access only to the badly preserved and uninformative isotypic specimens distributed to several eastern herbaria in Phyc. Bor.-Amer. 1160. Recently I examined with great care the copious material of the TYPE in the New York Botanical Garden. Most of it is quite as dubious as that in the Phycotheca specimens, but certain portions are sufficiently well preserved to show that the species designated by Collins is the same as *O. luteola*. Collins' description is so sketchy that it might easily apply to several of Gomont's species. For a fuller characterization of *O. salinarum*, the reader is referred to the original description of *O. luteola*. SOMERSET COUNTY: brackish ditch, Ewell, Smiths Island, *2309* (D); with *O. margaritifera*, marsh ditch near Wenona, *P. W. Wolle*, June 12, 1938 (D); with *Hydrocoleum Holdenii*, Tylerton, *Wolle*, Aug. 12, 1938 (Fi, Wolle).

OSCILLATORIA FORMOSA Bory ex Gom.—In fresh water. SOMERSET COUNTY: roadside puddle, Church Street, Princess Anne, *P. W. Wolle*, Aug. 25, 1938 (FM, Wolle).

OSCILLATORIA BREVIS Kütz. ex Gom.—On moist soil and in rainwater pools. SOMERSET COUNTY: on mud, Wenona, *2277* (D).

OSCILLATORIA BREVIS var. NEAPOLITANA (Kütz.) Gom.—In brackish and semi-marine waters. SOMERSET COUNTY: on pilings, Wenona, *2287* (D); with *Phormidium Weissii*, puddle at old wharf, Shelltown, *P. W. Wolle*, Nov. 21, 1938 (FM).

SPIRULINA MAJOR Kütz. ex Gom. *S. densa* Lillick, Amer. Midl. Nat. 16:210 (1935).—SOMERSET COUNTY: brackish pool, Wenona, *2288* (D). CALVERT COUNTY: Cove Point, *H. C. Bold*, July 6, 1937 (FM).

SPIRULINA TENERRIMA Kütz. ex Gom. *S. socialis* Gardn.,[1] New York Acad. Sci., Sci. Surv. Porto Rico 8: 272 (1932).—In brackish

[1] There appears to be no reason to separate the TYPE of *S. socialis* in the New York Botanical Garden, PUERTO RICO: Santurce, *M. A. Howe 2162a*, May 27, 1903, from other specimens of *S. tenerrima*.

and marine waters. SOMERSET COUNTY: marsh pool between Ewell and Rhodes Point, Smiths Island, *2304* (D).

SPIRULINA SUBSALSA Oerst. ex Gom. *Arthrospira subsalsa* Crow apud Croasdale, F. W. Alg. Woods Hole, Mass. 18 (1935).—In marine and brackish waters. SOMERSET COUNTY: with *Oscillatoria amphibia*, in a marsh pool between Chance and Dames Quarter, *2161A* (D).

To Be Excluded

Microcystis Donnellii Wolle, Bull. Torr. Bot. Club 6: 282 (1879), is represented in the original collection by a ciliate protozoan with endophytic green cells: GARRETT COUNTY: *J. D. Smith*, July 1878 (TYPE in Herb. Univ. Pennsylvania; Isotype, U).

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